UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/314,637	05/19/1999	MAZIN G. RAHIM	ATT.0030000	5478

7590 12/02/2005	EXAMINER
Mr. S H Dworetsky	ARMSTRONG, ANGELA A

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ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 12/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application No.	Applicant(s)
Office Action Summary		09/314,637	RAHIM ET AL.
		Examiner	Art Unit
		Angela A. Armstrong	2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1.   Claims 30-34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Alleva et al (US Patent No. 5,970,449) in view of Sukkar (US Patent No. 5,613,037).

2.   Regarding claims 33 and 37, Alleva et al teaches a system for text normalization in

which the output of a speech recognizer is processed to produce a representation of the

appropriate digits. Alleva describes the speech recognition processor that produces textual

output corresponding to recognized portions of input speech, such that the recognizer produces

text such as "ten cents" and "four o'clock in the afternoon", which reads on "a speech

recognition processor that receives unconstrained input speech and outputs a string of words, the

speech recognition processor being based on a numeric language that represents a subset of a

vocabulary, the subset including a set of words identified as being relevant for interpreting and

understanding number strings," since the words ten, cents, four and o'clock are the vocabulary

words of numeric language that are relevant for interpreting and understanding number strings

related to currency and time (col. 3, line 18 to col. 4, line 6; Abstract; Figure 1, element 32;

Figure 9, element 132; col. 1, lines 56-62; col. 6, lines 14-17 and 40-42; col. 5, lines 62-65 and

col. 6, lines 32-64);

At col. 6, lines 14-64, Alleva et al describes the rules the text normalizer (element 38,

Figures 3A-3E) implements to process the string of words received from the speech recognizer to

generate a sequence of corresponding digits, which reads on "a numeric understanding processor

containing classes of rules for converting the string of words into a sequence of digits."

Alleva fails to explicitly teach a system comprising acoustic models utilized by the

speech recognition processor. However, implementation of acoustic models in a speech

recognition system was well known in the art.

Sukkar discloses a speech recognition system comprising acoustic model, utilized by the

speech recognition processor (Figure 3, element 308). Additionally, Sukkar teaches a digit

model for digit recognition and a second model, a filler model, a generalized HMM model of

spoken words that do not contain digits (col. 3, line 19 to col. 4, line 22).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention

to implement the acoustic model teachings of Sukkar in the recognition system of Alleva, for the

purpose of accurately producing vector representations of the received input speech.

Alleva does not teach a validation database or a string validation processor. At col. 7,

lines 6-49, Sukkar describes candidate string validation based on individual candidate digit

confidence scores that are determined using a digit vocabulary set of the digit models. Sukkar

teaches the string validation is implemented so that errors in the string cause the string to be

rejected, which is desirable for many applications.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention

to modify the system of Alleva to implement string validation as taught by Sukkar, for the

purpose of ensuring that only valid digit information is accepted and applications using the system process and operate with valid data.

Regarding claim 30, Alleva fails to explicitly teach a first set of hidden Markov models that characterize acoustic features of words in the numeric language and a second set of hidden Markov models that characterize acoustic features of words in the remainder of the vocabulary.

Sukkar teaches a digit model for digit recognition and a second model, a filler model, a generalized HMM model of spoken words that do not contain digits (col. 3, line 19 to col. 4, line 22).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to implement the acoustic hidden Markov model teachings of Sukkar in the recognition system of Alleva, for the purpose of accurately producing vector representations of the received input speech.

Regarding claim 31, Alleva fails to explicitly teach a filler model that characterizes out of vocabulary features.

Sukkar teaches a digit model for digit recognition and a second model, a filler model, a generalized HMM model of spoken words that do not contain digits (col. 3, line 19 to col. 4, line 22).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to implement the acoustic hidden Markov model teachings of a filler model, as suggested by Sukkar in the recognition system of Alleva, for the purpose of accurately producing vector representations of the received input speech to accurately distinguish numeric input from other speech input.

Regarding claim 32, Alleva fails to teach an utterance verification processor. At col. 5, lines 44-52, Sukkar describes a digit/non-digit classification that identifies speech containing valid digits, speech not containing a digit and speech containing misrecognitions. Sukkar teaches the misrecognitions are identified as non-digits so that errors can be rejected and not classified as valid digit data.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Alleva to implement utterance verification as taught by Sukkar, for the purpose of ensuring that only valid digit information is recognized and classified as actual digit speech.

Regarding claim 34, at col. 8, lines 28-38, Alleva teaches the normalizer normalizes the text and a speech API forwards the normalized content to a application program, which reads on "a dialogue manager processor that initiates an action based on the validity information."

Regarding claim 36, Alleva teaches a set of rules includes a naturals rule, a restarts rule, a city/country rule, and a alphabets rule at Figure 9, element 126 and col. 6, line 3 to col. 7, line 9. Alleva does not teach the set of rules includes a re-starts rule. At col. 5, line 48-52, Sukkar discloses implementation of a misrecognition classifier, so as to account for the errors during recognition.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to implement process or normalize the words in the numeric language output from the speech recognizer that are related to recognition errors to account for errors during the recognition process, as suggested by Sukkar, for the purpose of providing reliable and accurate recognition and thereby improve system performance.

3.   Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alleva et al (US

Patent No. 5,970,449) in view of Sukkar (US Patent No. 5,613,037) and further in view of Huang

et al (US Patent No. 5,937,384).

4.   Regarding claim 35, Alleva and Sukkar do not specifically teach a language model

database that stores data describing the structure and sequence of words and phrases. Huang

teaches a language model that represents linguistic expressions and describes the implementation

of language model in predicting the likelihood of occurrence of a word considering the words

that have been uttered (col. 14, lines 35-54) and teaches the system is beneficial in improving the

recognition capability of a speech recognition system.

        Therefore, it would have been obvious to one of ordinary skill at the time of the invention

to modify the system of Alleva and Sukkar to implement language models in predicting

likelihoods of word occurrences, as taught by Huang, for the purpose of improving recognition

capability of the speech recognizer.

Allowable Subject Matter

5.   Claims 14-16 and 18-27 are allowed.

6.   Claim 36 is objected to as being dependent upon a rejected base claim, but would be

allowable if rewritten in independent form including all of the limitations of the base claim and

any intervening claims.

        The following is a statement of reasons for the indication of allowable subject matter: the

prior art of reference fails to specifically teach or fairly disclose a numeric language that includes

digits, natural numbers, alphabets, re-starts, and city/country name classes, such that the re-starts

include the set of phrases indicative of false-starts, corrections and hesitations.

Response to Arguments

7.   Applicant's arguments filed September 16, 2005, with respect to claims 30-35 and 37

have been fully considered but they are not persuasive. Applicant argues Sukkar does not teach

a string validation processor that outputs validity information based on a comparison of a

sequence of digits output by the numeric understanding processor with valid numbers in the

validation database. In response, the Examine argues Sukkar describes candidate string

validation (sequence of digits) based on individual candidate digit confidence scores that are

determined using a digit vocabulary set of the digit models (valid numbers in the validation

database), thus providing adequate support for string validation processor limitation.
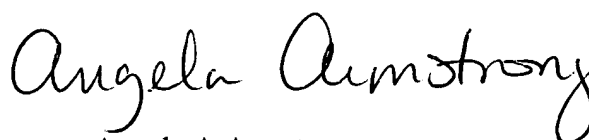

        Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Angela A. Armstrong whose telephone number is 571-272-7598.

The examiner can normally be reached on Monday-Thursday 11:30-8:00 PM.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Richemond Dorvil can be reached on 571-272-7602. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Angela A Armstrong
Primary Examiner
Art Unit 2654

AAA
November 28, 2005